

PATENT SPECIFICATION

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(54) DEVICE FOR CLEANING THE PRINTING CYLINDER OF AN OFFSET COPYING MACHINE

(71) We, ANTONIO CORONA S.P.A. of Via dei Chiaramonti 19, 20148 Milan, Italy, of Italian Nationality, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a device for cleaning the printing cylinder of an offset copying machine.

As is known, offset copying machines comprise a printing cylinder provided with rubberized cloth which carries the printed characters which are to be transferred from the matrices to the copy-sheets. At the end of each series of copies made from one matrix, the printing cylinder must therefore have the ink cleaned from it so as to make it in the highest degree suitable for the execution of a subsequent series of copies of another matrix. The said cleaning has thus far been carried out by hand (for example with a wad of cottonwool soaked with solvent) or also mechanically — but with inadequate means, the major inconvenience of which is generally represented by the fact that the solvent, with which the paper or other ribbon-shaped cleaning material (stretched between rollers upstream or downstream of the zone of contact with the printing cylinder) is soaked, gradually evaporates with the result of rendering the cleaning action ineffective or in any case of prolonging it for an excessive length of time with consequent rapid consumption of the material (among other things if the section of cleaning material involved in a single cleaning operation is very long, the ink has no time to dry before reaching the downstream rollers, so that it ends up by soiling them and thus making their frequent cleaning a necessity).

There is a need to provide a device for cleaning the printing cylinder of an offset copying machine, which overcomes the aforesaid inconvenience (solvent evapora-

tion) so as to keep the cleaning action permanently efficient and rapid, to allow a minimum consumption of cleaning material and to prevent the need for a frequent cleaning of the rollers or other mechanisms with which the cleaning material comes into contact after removal of the ink from the printing cylinder

The invention consists in a device for cleaning the printing cylinder of an offset copying machine, characterized in that it comprises a container furnished with an inner chamber communicating with the outside by means of a narrow opening, through which is caused to pass a section of a roll of ribbon-shaped cleaning material soaked with solvent, housed inside the said chamber, the outer end of the said roll being wound onto a spindle having a rest position close to said opening and a work position in which the spindle is coupled to a drive member, means being provided for causing a section of the cleaning material comprised between said spindle and said opening to contact the surface of the printing cylinder when the spindle is in said work position.

The invention also consists in a cartridge of ribbon-shaped cleaning material soaked with solvent to be used in a cleaning device comprising a container having a narrow opening and containing a roll of material soaked with solvent, and a spindle receiving the material from the container, means being provided for releasably holding the spindle in a rest position close to the opening of the container.

It is evident that, as the inner chamber of the container communicates with the outside only through a narrow opening almost wholly occupied by the section of cleaning material emerging from the container, the evaporation of the solvent is very limited or even zero, especially when the spindle is left in the rest position. The cleaning material can thus maintain its properties unimpaired and allow a rapid and efficient cleaning which involves each time only a small section

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of material; in this way there is achieved a considerable saving of cleaning material and, at the same time, it is made possible for the removed ink to dry completely before reaching the pulling mechanisms, so as to avoid the troublesome necessity of periodical cleaning of the said mechanisms. Furthermore, the section of ribbon in contact with the cylinder is constantly renewed, thus ensuring perfect and rapid cleaning of the cylinder. Suitable pulling rollers can be provided to ensure a constant feed rate of the ribbon, while the spindle on which the ribbon is wound can be driven by friction drive means able to compensate for the variations of diameter.

An exemplary embodiment of the device according to the invention is illustrated in the attached drawings, in which:—

FIGS. 1A and 1B are front, partially in section, views of a device according to the invention;

FIG. 2 is a cross section view taken on the line II—II of FIG. 1A;

FIG. 3 is a cross section view taken on the line III—III of FIG. 1A;

FIG. 4 is a cross section view taken on the line IV—IV of FIG. 1B;

FIG. 5 is a cross-section view taken on the line V—V of FIG. 1B;

FIG. 6 is a sectional view taken on the line VI—VI of FIG. 2;

FIG. 7 is a plan representation of a removable and replaceable cartridge comprising the assembly made up of the container, of the spindles (at rest position) and of a roll of paper soaked with solvent;

Fig. 8 is a sectional view taken on the line VIII—VIII of FIG. 7;

FIG. 9 is a sectional view taken on the line IX—IX of FIG. 1B, referred, however, to a phase of replacement of the aforesaid cartridge.

The device illustrated in the drawings comprises two fixed side walls 1, from which project in overhanging manner two pairs of pins 2 and 3, to which are hooked two side panels 4 provided with locking levers 5 pivoted at 6 and provided with retaining springs 7 (FIGS. 1 and 4). The two panels 4 which are made fixed one to the other by three rods 8, 9 and 10, rotatably support a roller 11, on the outer extensions of which are engaged two movable side panels 12 (FIGS. 1 and 3), each of which has a protruding block 13, on which is able to act one of two finger elements 14 connected to a common shaft 15 actuatable in reciprocal rotation by means of an electromagnet 16 (FIG. 1) of the type described and illustrated in the Italian patent specification No. 932,810 filed on 15.7.1971 in the name of the same Applicant. Each of the panels 12 is moreover provided with two cavities 17 and 18, into which are inserted (and locked by

means of a lever 19 pivoted at 20 onto the panel 12 and provided with a retaining spring 21) two hooking pins 22 of a replaceable cartridge 23. This latter comprises a container 24, which consists of a tubular casing 25, endowed with a certain elasticity and of substantially om ga-form (FIGS. 2 and 8), and of two end caps 26, from which the pins 22 protrude in pairs (FIG. 7). Inside the container 24 a cylindrical chamber is thus defined, which communicates with the outside exclusively through a narrow opening 27, through which emerges a ribbon of wetted paper 28 which unwinds from a roll freely housed inside the container 24 and winds up onto a spindle 30 movable between the rest position of FIGS. 7 and 8 (snap-hooked to the two end caps of the container 24) and the work position of FIG. 2 (supported by two end supports 31 and 32, of which one only is axially movable in a fixed block 33 against the action of a spring 34, FIG. 6, and the other is axially movable in a fixed block 35 against the action of a spring 36 and also rotatable about its own axis by effect of a drive transmitted through a motor 37 and a gear 38, FIG. 6). When the spindle 30 comes to be in the work position of FIG. 2, the ribbon 28, in passing from the roll 29 to the spindle 30 where it forms a new roll 39, rests against the lower turned-up lip of the casing 25 and then passes between the roller 11 and an idle roller 40, which has its ends passing through eyelets 61 of the panels 12 and is rotatably supported by a pair of brackets 41, each of which is movable in the direction of the line extending between the axes of the rollers 11 and 40 under the guide of two eyelets 42 (in engagement with the roller 11) and 43 (in engagement with the pin 3) and against the action of a spring 44 (which holds it in the position of FIG. 2, to which corresponds the engagement between the rollers 11 and 40).

The device illustrated in the drawings is, lastly, completed by a drive assembly which comprises (FIGS. 1, 4 and 5) a gear 45 keyed onto the axis of the printing cylinder 46 and thus rotatable together with the cylinder (driven in known manner), an electromagnetic friction 47, controllable in synchronization with the electromagnet 16 and a series of idle gears 48-59 and 38, the gears 57 and 38 being respectively connected to the roller 11 and, when in the position of the FIG. 2, to the spindle 30. The operation of the device illustrated in the drawings is as follows:

With the spindle 30 in the work-position of FIG. 2, if the electromagnetic friction 47 and the electromagnet are simultaneously energized, the spindle 30 and the roller 11 are rotated and, on the other hand, by means of the thrust action exerted by the finger elements 14 on the blocks 13, the panels 12

are rotated about the axis of the roller 11 until the section of ribbon 28 comprised between the opening 27 of the container 24 and the rollers 11 and 30 contacts the surface of the printing cylinder 46.

5 The brushing of the printing cylinder 46 (normally moved at high speed) against the paper ribbon 28 (which is continually renewed so as always to present a clean zone to the cylinder, which fact allows soaking with solvent to be limited with the result that the surface of the cylinder is left almost dry and perfectly cleaned) enables the paper ribbon to remove the ink rapidly from the said cylinder, in this way effecting a rapid and effective cleaning thereof. In this phase the rollers 11 and 40 ensure perfect uniformity of feed rate of the ribbon; furthermore, the elasticity of the container 25 makes it possible to maintain a suitable pressure of the ribbon against the cylinder, immediately on emergence from the cartridge, thus ensuring the most suitable execution of the cleaning action and in particular preventing any evaporation of the solvent between the outlet from the cartridge and the surface of the cylinder. On termination of the cleaning, that is to say, in practice after a small feed advance of the ribbon 28, the de-energization of the electromagnetic friction 47 and of the electromagnet 16 is caused for the return of the device to the work position of FIG. 2.

As the cleaning operation proceeds, the ribbon 28 unwinds from the roller 29 and winds up onto the spindle 30, which rotates with constant circumferential speed by the presence of the electromagnetic friction 47 which by compensating for the variations of diameter of the roll 39, and by keeping the ribbon fed by the rollers 11 and 40 permanently under tension, allows perfect winding up of the ribbon. When the ribbon has fully unwound from the roll 39 and has wound up onto the spindle 30, it is necessary to replace the cartridge, which is done by breaking the engagement between the levers 5 and the pins 2 and causing the clockwise rotation of the panels 4 about the axis of the pins 3 until the position of FIG. 9 is reached: with the panels 4 in this position, the engagement of the rod 10 with the two fixed stops 60 stops any further rotation of the panels 4, while the engagement of the ends of the roller 40 with the said fixed stops 60 causes the brackets 41 to move against the action of the springs 44 for spacing the rollers 11 and 40.

At this point the engagement is broken between the levers 19 and the pins 22 of the container 24 so as to allow removal of the empty container and simultaneously the spindle 30 is removed from the supports 31 and 32 by pressing the springs 34 and 36. A fresh cartridge, with the spindle 30 in the rest

position of FIG. 8, is then hooked onto the panels 12 with reinsertion of the pins 22 into the cavities 17 and 18 and re-engagement of the levers 19; the spindle 30 is disconnected from the container 24, is passed between the two spaced rollers 11 and 40, and is rehooked to the supports 31 and finally, the panels 4 are caused to rotate in the opposite direction until the whole is brought back to the position of FIG. 2, maintained by the re-engagement of the levers 5 with the pins 2. The device is thus ready for a new series of cleaning operations with new ribbon and consequently is in the best condition for performing its function without requiring excessive soaking with solvent, and always leaving the cylinder dry and clean.

WHAT WE CLAIM IS:—

1. A device for cleaning the printing cylinder of an offset copying machine, characterized in that it comprises a container furnished with an inner chamber communicating with the outside by means of a narrow opening, through which is caused to pass a section of a roll of ribbon-shaped cleaning material soaked with solvent, housed inside the said chamber, the outer end of the said roll being wound onto a spindle having a rest position close to said opening and a work position in which the spindle is coupled to a drive member, means being provided for causing a section of the cleaning material comprised between said spindle and said opening to contact the surface of the printing cylinder when the spindle is in said work position.

2. A device according to claim 1, characterized in that said container consists of a tubular casing, having a protruding lip on either side of the said opening and two end caps provided with engagement means for engaging the spindle.

3. A device according to claim 2, characterized in that said end caps are furnished with means for disengageably connecting them to support means movable between a rest position and a work position in which, when said spindle is in the work position, said section of cleaning material comprised between said spindle and said openings contacts the surface of the printing cylinder.

4. A device according to claim 3, characterized in that the said tubular casing is made from elastic material and that said container is connected to said support means in such a manner that, when the said support means are in the work position, one of the protruding lips of the container is thrust into pressure-contact against the surface of the cylinder, pressing against it the section of ribbon occurring immediately after emergence from the container.

5. A device according to claims 3 and 4,

- characterized in that it comprises a pair of rollers between which, with the spindle in the work position, the roller is caused to pass the section of cleaning material leaving the engagement with the printing cylinder, the first roller being supported by a pair of brackets movable perpendicularly to the common tangential plane of the two rollers against the action of elastic retaining means, and the second roller being supported by a frame which also supports said pair of brackets and said support means and is movable between a work position and a non-work position in which fixed stop means engage said first roller so as to disengage it from said second roller by overcoming the action of said elastic means.
6. A device according to claim 5, characterized in that the said support means consist of a pair of panels rotatably supported by said second roller.
7. A device according to claims 5 and 6, characterized in that at least one of said rollers is motor-driven.
8. A device according to claim 7, characterized in that the said spindle is coupled to said drive member.
9. A cartridge of ribbon-shaped cleaning material soaked with solvent to be used in a cleaning device as claimed in any of the preceding claims comprising a container having a narrow opening and containing a roll of material soaked with solvent, and a spindle receiving the material from the container, means being provided for releasably holding the spindle in a rest position close to the opening of the container.
10. A cartridge as claimed in claim 9 wherein the container consists of a tubular casing having a protruding lip on either side of the said opening and two end caps provided with engagement means for engaging the spindle.
11. A cartridge as claimed in claim 10 wherein the lips are made from elastic material.
12. A device for cleaning the printing cylinder of an offset copying machine substantially as described with reference to and as shown in the accompanying drawings.
13. A cartridge of ribbon-shaped detergent material soaked with solvent substantially as described with reference to and as shown in the accompanying drawings.
- MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicants.

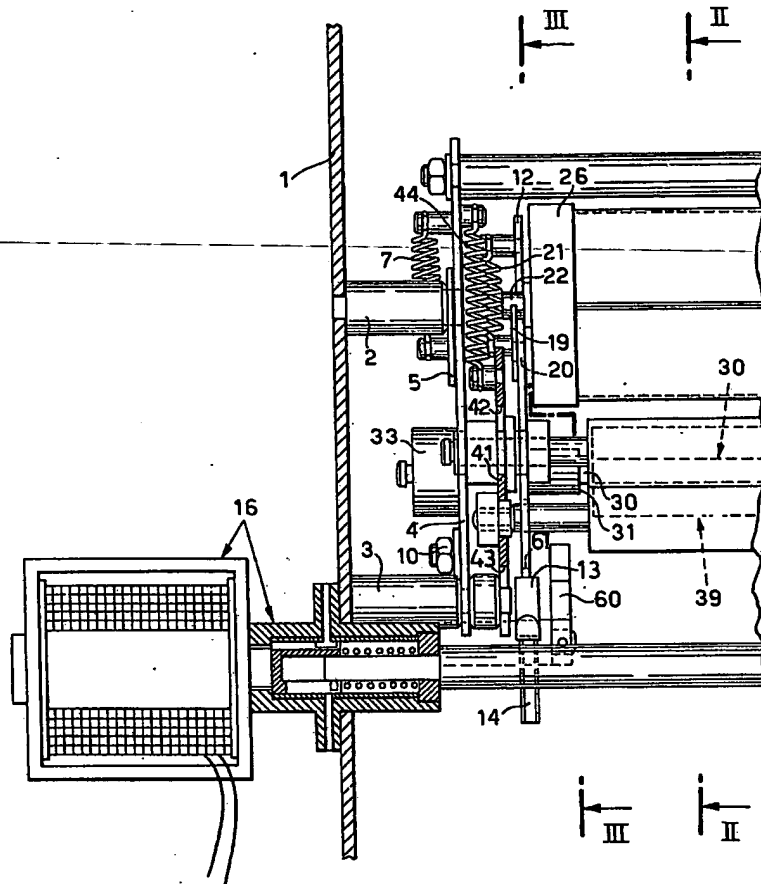
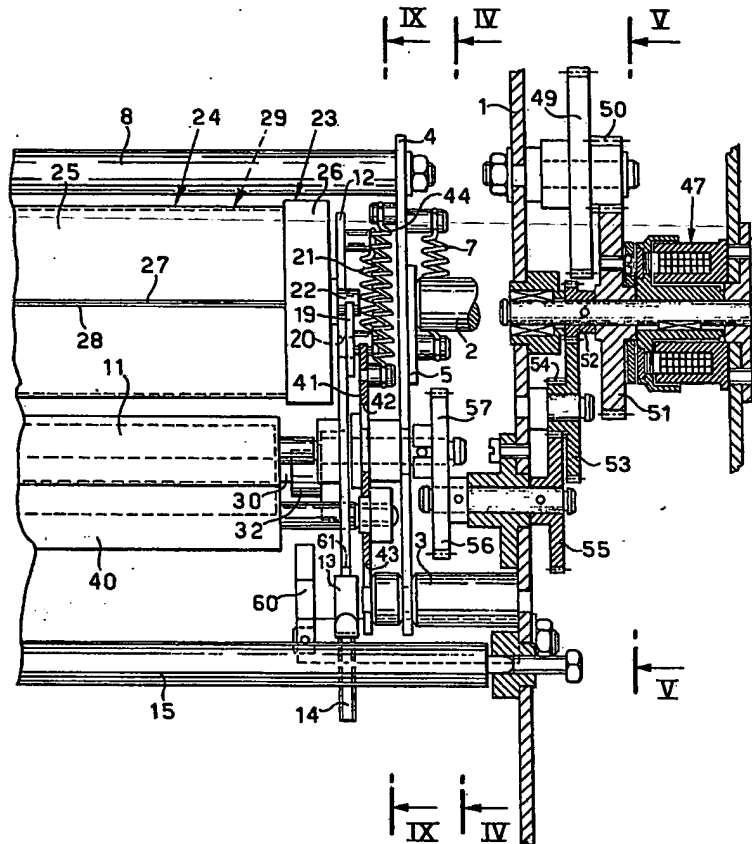
Fig. 1^A

Fig. 1^B



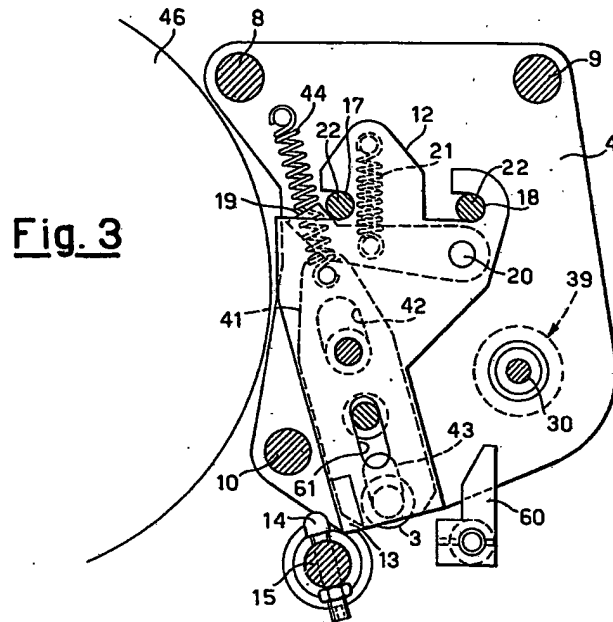
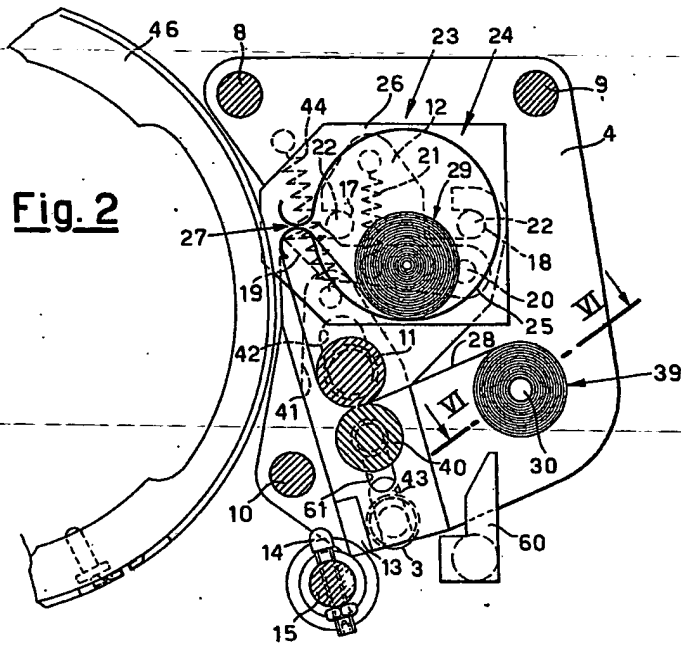
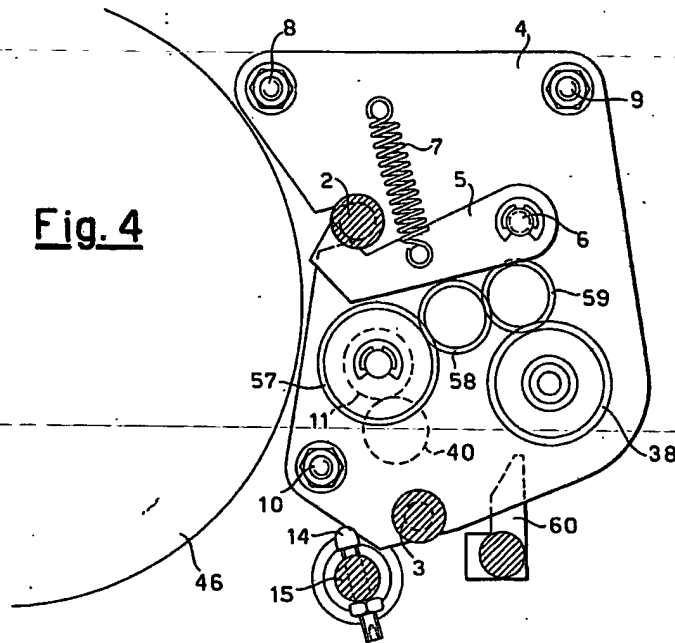
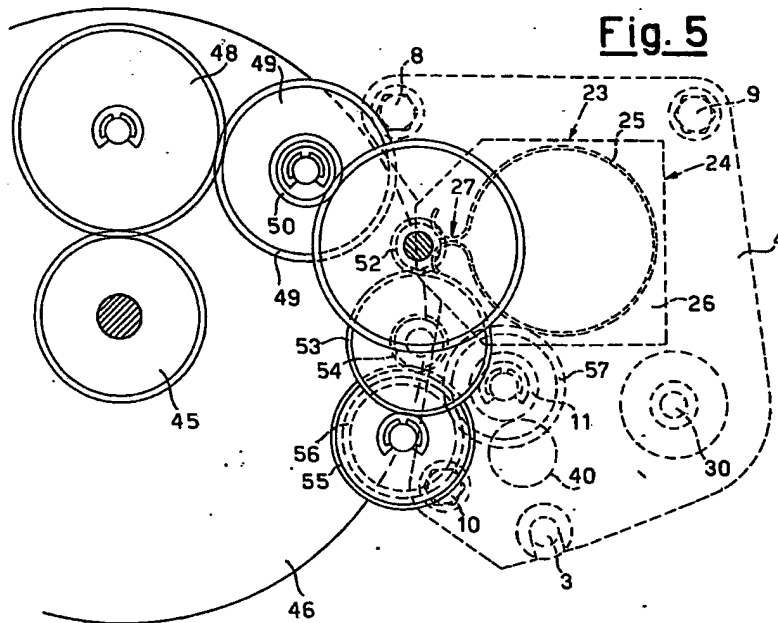


Fig. 4**Fig. 5**

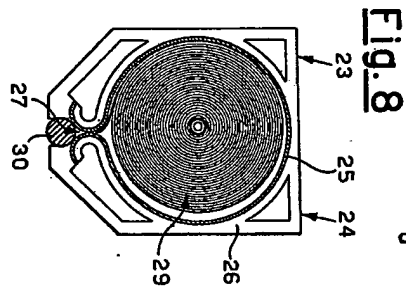
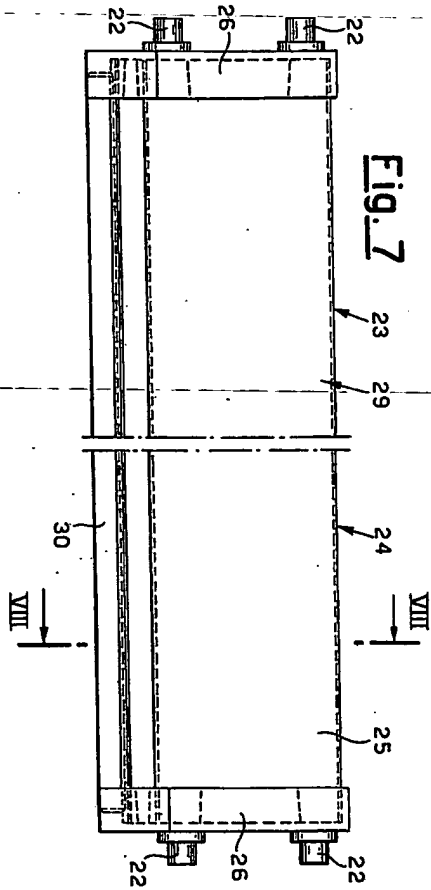
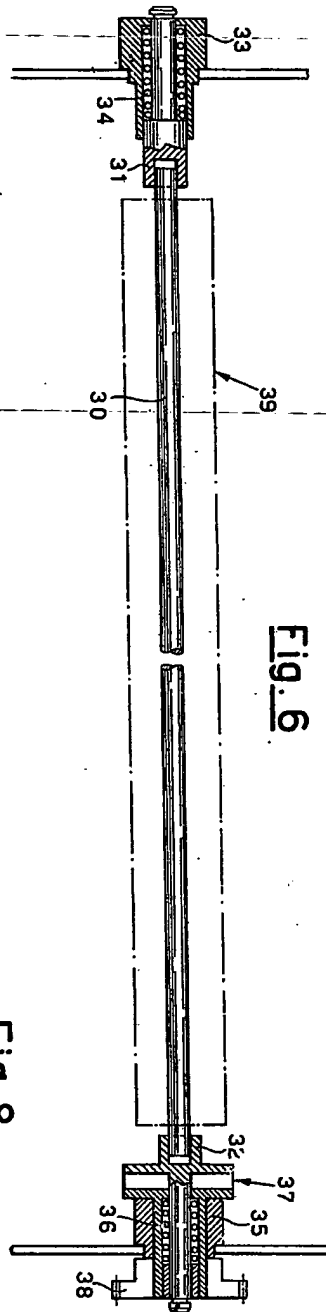


Fig. 9